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1. During Tsarist times a silk producing plant was located on the present site of Institute 160. French experts on silk production settled in Fryazino and vicinity and, until the fall of the Tsarist regime, many place names in the Fryazino area were reminiscent of the French settlement. When the Soviets came to power, silk production was discontinued. Between 1930-34 a new project was started at the place of the former silk factory. US experts from RCA used the old factory building at the southern end of the area and began producing radio transmission tubes. This project apparently was completed in 1934 and the US engineers left the plant, which continued tube production. The building usually referred to as the "Institute" was erected in 1939. This is only one building of the Institute compound, is four stories high, and primarily houses laboratories for all types of tube development. The OKBM (Central Office for Planning and Design) building and tube factory were also erected in 1939.

2. When fighting neared Moscow in 1941, Institute 160 was evacuated to Tashkent. All personnel, machines, and other plant equipment were transferred. A small plant which produced radio tube parts was all that remained at Fryazino. [REDACTED]

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[REDACTED] this small plant was located in what formerly had been the silk factory building. [REDACTED] not know whether the Germans occupied Fryazino during the war, but they may have done so briefly because the lines were very close, as evidenced by battle debris found in the immediate vicinity of Fryazino. Some of the personnel of Institute 160 returned from Tashkent in 1944 because they were unable to stand the rugged climate. However, the production of the tube plant at Fryazino did not expand during the war.

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3. After the termination of WW II, the Soviets began to reactivate Fryazino. The first group of German specialists arrived at Institute 160 in summer 1945, from the Fernseh AG in Tannenwald, Bohemia. The experts of the firm and the entire equipment of the plant had been transferred to Fryazino. At the end of the same year, machines and instruments of Tungsram in Budapest (?) were shipped to Fryazino, and during 1946 machines and equipment of Telefunken and Oberspreewerk in Berlin were added to the other dismantled equipment. When the German specialists from OSW arrived at Fryazino in October 1946, the plant was in a state of turmoil. The dismantled equipment was not yet installed and, since the equipment had been taken from plants having different production methods, the Soviets were not able to coordinate development and production. During this time the Institute was only engaged in small scale production of radio tubes. The only development that was being conducted concerned the British tubes ACA 1, VCR 1, and ACA 10, but even that lacked coordination and had virtually come to a standstill.

4. The German specialists, under the leadership of Dr Steimel and Dr Spiegel, considered the confusion at Institute 160 a challenge to their organizational abilities. Upon our arrival we were offered a vacation of three months, but we refused in order to begin organizing. The personnel which had been transferred to Fryazino from the OSW and the Fernseh AG were self-sufficient groups in that they could staff both the development and the production phases without help from the Soviets. Therefore, Dr Steimel set up the German group as though there were no Soviet personnel at the plant. He and Dr Spiegel formed the "German Management" (Deutsche Geschaeftsleitung) and appointed chiefs of the various departments and laboratories, laboratory engineers, work shop foremen, etc--down to the last mechanician.

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the organization

was as follows:

Department Chief: Werner Kluge

Chief of the Kinescope Laboratory: Helmut Klang

Assistant Construction Engineer: Koewing

Chief of the Iconoscope Laboratory: Walter Hass (also in charge of the development of Image Orthicons)

Chief of the Screen Development Laboratory: Walter Birbach

Assistant Engineer for Testing of the Tubes: Werner Fiedler

Chief of the Laboratory for Dark Trace Tubes: Juergen Rottgardt

Assistant Construction Engineer: Andreas Stutz

Chief of Test Equipment Development: Lothar Baer. Assisting: Technician Gutzke, and Mechanics Tippe, Kiedel, and Baschke

Chief of Tube Assembly: Willi Mueller. Assisting: Mechanics Kurt Arndt, Dettborn, Vahl

Glassblower Foreman: Max Richter. Assistant Glassblower: Simon

Pump Foreman: Karl Senf

While this enumeration is by no means complete, it reflects the self-sufficiency of the picture tube department and the fact that it could have operated independently.

5. Initially, the Soviets made no attempt to interfere with German supervision. They even tolerated the practice that all personnel difficulties, in addition to the technical and mechanical problems, were resolved by the German Management. For example, if a German specialist wanted to go to the dentist, he requested sick leave from the German

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Management rather than from a Soviet official. Furthermore, the Soviets submitted to German leadership in the laboratories and work shops, acting as though they were apprentices to the German specialists. While not wishing to revamp the organizational structure of the Institute, Dr Steimel's ambition was to broaden the scope of the Institute's development and production. Therefore, as entirely new fields of development in the picture tube department, he introduced: (1) the iconoscope and (2) the special tubes (including dark trace tubes). The complete organization and distribution of the work as set up by Dr Steimel took about one year. [] approach to [] assignments was exactly as it had been in Germany. [] did not keep strict office hours, but stayed on at the plant [] to spend extra time on the solution of an immediate problem, or when [] [] a conference had not reached a satisfactory conclusion at the close of the working day.

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6. The accomplishments of the Germans in this first year (until the beginning of 1948) were as follows:

- a. Organization of the Institute into departments, laboratories, work shops, etc., with definite assignments for each component.
- b. Standardization of production systems, which made it possible to produce parts not only for one type of tube, but for several types, and which reduced the various production systems of Fernseh AG, Tungram, and OSW to a common denominator.
- c. Building up a store of tools and parts in order to have a reserve on hand. This storage included such basic items as nails, screws, bolts, nuts, condensers, etc, all of which were difficult to obtain.
- d. Creation of the so-called "Construction Bureaus" which coordinated the theoretical work done in the laboratories with the actual production. The construction bureaus were responsible for the minute description of the production processes, specifying the tools necessary for production, the tolerances, the materials, measurements, etc. The institution of the construction phase was entirely unknown in Institute 160 when we arrived there.

7. By the end of 1947 these accomplishments of the German specialists had resulted in the following:

- a. The British tubes, ACA 1, VCR 1, and ACA 10, were standardized and made ready for serial production.
- b. The development of the special kinescopes was under way.
- c. The development of iconoscopes had been initiated.
- d. The development of dark trace tubes was progressing.
- e. A process had been developed of evaporating the luminous materials on the tube screen.
- f. Fusing machines, which fused the tube envelopes onto the bases, had been constructed and were in operation.
- g. The tube stems, which were produced in a Moscow glassblowing shop because the shop in Fryazino was unable to achieve the required precision, were standardized. This facilitated the use of uniform deflection systems for all but the very special tubes.
- h. The production process for all tubes was standardized, paving the way for increased production.

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A work project which was assigned during the latter part of 1947 concerned the detailed designing of a new tube-producing institute. In the fall of 1947, the Soviets called approximately 20 German engineers into a conference room and stated that they were to design an institute for the production of radio and picture tubes. The plans were to be drawn up in great detail, enumerating all facilities necessary for the operation of an institute. The rooms were to be laid out according to the various phases of the development and production of tubes. Equipment necessary for the laboratories was to be specified and carefully included in the plans; machines for production, eg, pumps, fusing machines, etc, were to be described as to type, performance, and place of installation. The institute was to be similar to the development institute of Telefunken, containing everything that was needed in the development of tubes, such as klystrons, waveguides, high frequency, etc.

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The German engineers worked on this project for three months. (They were told that the institute was to be completed by 1950, and that it was going to be erected in Fryazino. We do not know if the institute was erected elsewhere; but, at the time of our departure, no such building had been completed at Fryazino.)

8. The Soviets began to show signs of resistance against the German Management during the first months of 1948. On one occasion the Soviets claimed that the German specialists had come to the USSR on their own volition, on the strength of contracts they had signed. The specialists protested against this statement, and Dr Steimel went on strike. After his strike had lasted for several weeks, the Soviets took him to Moscow, where he remained for two or three days. After his return, he went to work again, but conditions had changed. For all practical purposes, the German Management had expired after Dr Steimel's detention in Moscow. Dr Steimel was transferred into another office and Dr Spiegel was transferred into a laboratory. The Soviet chiefs of departments and laboratories became the superiors of the German chiefs, who were now termed "advisers". The German Management no longer worked out the quota plans for the German group; they were given individual plans made up by the Soviet department chiefs, prepared without any direct consultation with the Germans. Throughout 1947, [redacted] actively engaged in drawing up the plans for our operations; after 1947 [redacted] never again saw a plan [redacted] at Fryazino. Only occasionally [redacted] consulted by [redacted] Soviet superiors regarding certain phases of our work. As a result, the working zeal of the German specialists diminished considerably, and [redacted] it never happened again that the Germans stayed after working hours in order to do extra work. Administratively, the German group also lost its independence. For example, [redacted] to consult a doctor, or [redacted] to take [redacted] vacation, [redacted] had to check with the Soviet officials. In no case could the Germans make a decision which concerned the administration or the operation of the plant.

9. Operationally and administratively, the Soviets had taken over very smoothly. Of course, the change was not effected in one day, as it is not the manner of the Soviets to act hastily or suddenly. However, by the time the Soviets had completed the change, the organization of the Institute was perfected to the point that the Soviets could run the Institute by themselves. All departments were staffed with personnel and given assignments; the laboratories were engaged in research, and the development of tubes had surpassed the Soviet's initial plans.

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10. The expansion of the Institute, resulting from the efforts of the German specialists, had been accompanied by an acceleration in construction. [redacted] at Fryazino, the Soviets built a new brick building consisting of two floors which housed the production of magnetrons. This building was completed in 1949. A building of the same shape and type was erected next to the magnetron building, and the primary laboratories of the Institute, ie, those concerned with the development of transmitter tubes, were moved into it. The testing equipment for the transmitter tubes was moved into this building, as was the entire production apparatus which previously had been housed in the former silk factory. A new building for the OKBM was completed in October or November 1951. [redacted]

25X1 in 1946, a large area in the middle of the plant compound had been excavated and a concrete foundation was built. This large excavated area remained unchanged [redacted]

25X1 [redacted] (in February or March 1952), the Soviets began placing a fence with watchtowers around this area. Since the Soviets always used penal labor in the construction of buildings and the fence and watchtowers indicated that penal labor was going to be used, [redacted] some construction was about to begin. It is possible that the Soviets intended to build here the institute which the German engineers had designed see paragraph 7 above and that they had only awaited the departure of the Germans before starting on this project.

11. If the building activity in the plant area was lively, the building activity in the town of Fryazino was even more noticeable. [redacted]

25X1 [redacted] the town population had increased from approximately 8000 inhabitants to about 30,000. Since the entire population was either directly or indirectly connected with the Institute, the increased population testified to the importance which the Institute had gained between 1946 and 1952. (As a matter of fact, a Soviet citizen not connected with Institute 160 was not permitted to reside in Fryazino.) In 1949, the streets of the town were asphalted, and a paved highway from Moscow was constructed in 1949-50. Plants for the production of asphalt and gravel were also built in Fryazino. The sanitarium at Semashko was converted into a technological institute for young workers, although the Ministry of Health clamored for its release as a sanitarium.

12. [redacted] to compare the status of Soviet research and development in 1952 with that of Germany's in 1945, and (insofar as we could follow it in technical periodicals available in the Institute) with America's, [redacted] the Soviets were ahead of the German level of 1945 and about three years behind the present US level. Regarding this comparison [redacted]

25X1 a. The dark trace tube [redacted] has been developed much further in the USSR than it was during the war years in Germany. Specifically, the method of the evaporation in the tube in a manner that the screen was kept in a vacuum was entirely unknown in Germany at the time of our deportation.

b. The kinescopes were a development beyond Germany's of 1945, because at Fryazino we combined the German and US methods, using the German design and the US method of manufacture.

c. The method of manufacture of the iconoscopes and super-iconoscopes was improved beyond the German level of 1945.

d. The oscillograph tubes of British design were put into serial production by the Germans at Fryazino, who added their theoretical knowledge regarding the production of oscilloscope tubes.

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e. The image orthicon was entirely new to the Germans, and its development in the USSR by German specialists opened a field for German research which was unknown in 1945.

f. The klystron and magnetron were developed at Institute 160, based on US publications and the ability of the Germans to interpret the drawings and build the tubes in a manner which adapted the drawings to conditions at the Institute. Neither of these tubes was produced in Germany during the war.

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in 1945 the Germans were unable to rebuild a US klystron which had been captured.

13. [redacted] the work of the German scientists and the extensive use of US scientific literature has saved the Soviets approximately five years of original research. Conversely, the Soviet method of copying other people's work has a paralyzing effect on Soviet initiative and independent thinking. It is obviously much easier to use the ideas of others in order to advance one's own development. It is also much more convenient to plan for the next year if it is known what materials and equipment will be needed, and if the trial and error factor incidental to every development is excluded. [redacted] however, these trials and errors constitute the scientific education, and their absence will be felt when original thinking is needed. However, it would be wrong to rely on the Soviet lack of original scientific planning and to underestimate the Soviet ability of getting along independently. The Soviets are masters of improvisation and are able to get along very well with equipment which is not perfect in design.

14. The confidence of the Soviets in their ability to get along alone was expressed when they became more and more independent of German guidance. This trend was very marked. First, some of the Germans were replaced in their laboratories, as in the case of Dr. Schloemilch.

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[redacted] later, German personnel were removed from workshops. [redacted] an incident which occurred in January 1951, shortly after the first group of Germans had left Fryazino. All German mechanics in the workshops, with the exception of the coppersmiths, were returned to Germany. Thereupon, the coppersmiths were assigned to the various workshops to complete the work which the German mechanics had left unfinished. The work was in no way connected with copper-smithing. Meanwhile, the copper shop of Fryazino, which had depended entirely on the work of the German specialists, was unable to fulfill its January quota. For that reason, the chief of the copper shop called upon the Germans during the last days of the month, requesting that they work overtime in order to get the quota fulfilled. When the plant management heard about this, the copper shop supervisor was severely reprimanded, and the Germans were moved into another building. The separation of the so-called "Secret Department" from the work of the Germans was another indication that the Soviets felt confident that they could operate for themselves. Apparently they attributed a great deal of importance to the Secret Department because they recruited the most intelligent engineers and laboratory aides from other departments and laboratories for this new effort. Two young engineers [redacted] were transferred to the Secret Department, and [redacted] a considerable number of very capable engineers came to the plant from the outside.

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15. The Soviets learned the following from the Germans:

- a. How to copy foreign models intelligently, ie, in a manner which was adapted to their ability, their conditions of work, and the available materials.
- b. To evaluate and even to improve on a drawing.

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- c. If confronted with a new problem, to solve it by applying the knowledge already gained from analogous situations.
- d. To be critical of things that have already been done.
- e. In case of failure, not to change three things simultaneously but to make one change after another until the source of the failure has been determined.

25X1 With these points well learned, [redacted] do not think that the departure of the Germans will leave a big gap in the development and production effort at the Fryazino Institute. Through the efforts of the Germans, the Institute gained such a good name in the field of telecommunications that it attracted some of the best engineers of the country. [redacted] the departure of the Germans will result in slowing down the operations at Fryazino, but [redacted] do not think that it will have more serious consequences.

25X1 16. [redacted] the departure of the Germans came at a perfectly logical moment, as the usefulness of the Germans was exhausted. The primary factor contributing to this was that no West or Central European can live in the USSR longer than about five years without becoming apathetic. This thesis had been quoted [redacted]
 25X1 [redacted] by a Russian [redacted]
 25X1 While [redacted] taken a real interest [redacted] at first and were eager to participate in chess games, playing musical instruments, or, singing, reading of good literature in groups, etc., [redacted] gradually discontinued all such pastimes. In the last year [redacted]
 25X1 [redacted] a state of apathy which was appalling. Quite a few [redacted]
 25X1 began drinking [redacted] or playing solitaire evening after evening, without being able to get out of our rut. [redacted] cannot really account for this state of mind, but [redacted]
 25X1 [redacted] the petty fight which arose following each proposal, request, and phase of our work must have affected [redacted] nervous systems.

25X1 25X1 Another reason for [redacted]
 25X1 return at that time was that [redacted] Germans had nothing further professionally to offer the Soviets. [redacted] had shown them the results of [redacted]
 25X1 development and research in Germany during the war, and had taught them how to interpret the work of others intelligently. With that,
 25X1 [redacted] was at an end and [redacted] removed from the scene,
 25X1 perhaps on the eve of some new phase of development.

25X1 17. [redacted] not get the impression that the Soviets were planning to open new fields in the picture tube production at Institute 160. [redacted]
 25X1 [redacted] the next few years will be devoted to the development of four types of tubes: (1) the metal kinescope; (2) the image orthicon;
 25X1 (3) the videcon, which had been started in development by Dr Walter Hass; and (4) the so-called "memory" tube, which was being developed in the Secret Department. [redacted] the Soviets will solve whatever difficulties are involved in the development of these special tubes.

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